REMARKS

Claims 1-23 are pending in the current application. Applicant has amended claims 1-7, 10, 13-19, and 21-23. Reexamination and reconsideration of all claims, as amended, are respectfully requested.

Claim Style Amendments

Applicant has amended claims 1-7, 10, 13-19, and 21-23 to remove the "lettering" of elements of individual claims, including removing use of "a)," "b)," "b1)," "b2)," and so forth. Removal of these "letter" indications are introduced for stylistic preference reasons, or reasons completely unrelated to patentability. Applicant has also replaced the use of lettering in certain claims with appropriate claim terminology, such as the amendment to claim 23, again for reasons unrelated to patentability. Applicant submits that all claims are now in an acceptable stylistic form.

§ 102

The Office Action rejected claims 1-23 under 35 U.S.C. § 102(b) based on Szeliski et al., U.S. Patent 6,009,190 ("Szeliski").

Szeliski is directed to a texture map construction method and apparatus for displaying panoramic image mosaics. (Szeliski, Abstract) The Szeliski design constructs, from a set of overlapping images, a texture map divisible into plural faces. (*Id.*) The design computes a texture mapping transform which maps between pixel locations in the texture map and a <u>three-dimensional</u> coordinate system. (*Id.,* emphasis added) The design purportedly produces a set of image pixel values from the set of overlapping images for the one pixel location in the texture space. (*Id.*)

The present invention processes a digital signal to enhance resolution. (Specification, p. 3) The invention processes an image for display on a display having sub-pixel display capability. (*Id.*) As claimed in amended claim 1, the method includes calculating an intensity value for said first color to be displayed in said pixel area of said display, based on intensity of said first color for all pixels comprising said

first color in said region of said image, based on an unweighted average of said first color for all pixels in said region of said image. As shown in FIG. 6 of the present specification, for example, the red sub-pixel intensity is equal to the average of the red intensity of corresponding sub-regions of the sampled image. This relates to calculating an intensity value for a sub-pixel based on the intensity of a given color value, such as red, within the region of the sampled image.

Szeliski operates in a fundamentally different manner, probably best shown as element 3250 of FIG. 32. For every point u inside or beside the triangle being evaluated, Szeliski computes "a blended color (shade) of [point] u as a weighted sum of the colors of the corresponding pixels..." Thus Szeleski sums all colors, not just one color, to find color intensities. Szeleski does not sum all of the reds, separate from all of the greens, and separate from all of the blues, for the region evaluated. Further, Szeleski applies a weight, based on the proximity of the image pixel location to the center of the particular image. See, e.g., Szeliski, Col. 30, ll. 20-36. No such weighted average is claimed in amended claim 1.

Applicant therefore submits that claim 1 is not anticipated by Szeleski. Further, those claims dependent from claim 1 are allowable as they depend from an allowable base claim.

Claim 10, as amended, includes the limitation of "calculating an intensity value for said first color to be displayed on a sub-pixel of said display based on an unweighted average of the first color intensity for all sub-pixels in the region of the image, [based on intensity of a first color in a region of said image,] said sub-pixel corresponding to said region of said image based on a pre-determined mapping, said pre-determined mapping providing a unique region of said image for said sub-pixel, wherein said display comprises a plurality of colors." As with claim 1, Szeleski neither discloses nor suggests calculating an intensity value based on an unweighted average of the first color intensity for all sub-pixels in the region of the image. Szeleski operates on all colors and employs a weighted average of those colors, the weighting based on proximity to the center of the image.

Claim 16, as amended, now requires both employing an unweighted average of intensities for the first color based on intensities for the first color for multiple sub-pixels in the corresponding region, and repeating this employing for each sub pixel for other colors from said corresponding region, said repeating performed to calculate additional intensities associated with said other colors. Neither of these two limitations is shown in Szeleski. As discussed above, Szeleski does not employ an unweighted average of intensities for a first color, such as red, but instead provides a weighted average for all colors. Szeleski therefore does not, and cannot, repeat employing an unweighted average of intensities for other colors. Thus Szeleski materially differs from the claim as amended.

All claims depending from claims 10 and 16 are allowable as they depend from an allowable base claim.

Applicant notes that in addition to the differences presented above, certain other concepts claimed are not shown by Szeliski.

Calculating an intensity value for the first color is allegedly shown at col. 29, ll. 54-67. This passage of Szeliski states:

> In the fourth step, the pseudocolor associated with each pixel inside the composited image is found. This is done by referring to the pseudocolor of the triangle T associated with the matrix M_T used to compute x_k .about.M_k M_T^{-1} u. The composited pixel value (color or intensity) is placed into a corresponding pixel location in a triangle in the texture map if the pseudocolor of the composited pixel (stored in the auxiliary buffer constructed in step 1 above) matches the face color id tag of that triangle. The pseudocoloring/stenciling method described here facilitates the assignment of appropriate composite pixel values to pixel locations in invisible regions of the texture map by propagating pseudocolor id tags of pixels in visible regions into nearby invisible regions, as described above.

The foregoing passage does not discuss calculating an intensity value for the first color (such as red) to be displayed in the area of the display based on intensity of the first color (such as red) in the region of the image as required by the amended b) limitation of claim 1. No calculation of an intensity value is discussed, and certainly not based on the intensity of the color in the region of the image. Further, this limitation in claim 1 requires the region comprising an intensity value for each of said plurality of colors. No intensity for each of a plurality of colors, such as red from a group comprising red, green, and blue, is discussed in the foregoing passage.

The concept of "pseudocolors" differs from the "first color" of the present claims. Selecting specific pseudocolors is not discussed in Szeliski in detail. For example, if a triangle is orange, it is unclear what pseudocolor (orange or otherwise) is initially employed. Pseudocolors are discussed as follows:

> The first step, namely the painting of a unique pseudocolor into each triangle as a color id tag, uses an auxiliary buffer the same size as the texture map. Every pixel within the triangle is assigned the pseudocolor of that triangle. An RGB image can be used, which means that 2^{24} colors are available. (For ease of monitoring and debugging, each pseudocolor or face color "id" tag is converted into R, G, and B values by first un-interleaving the bits and then bit-reversing each color byte. This results in a color progression where the high-order bits in each channel vary most rapidly.)

Szeliski, col. 29, ll. 4-14. Again, if the triangle is orange, every pixel in the triangle is assigned the pseudocolor of orange. If magenta, then all pixels are magenta. This differs from calculating an intensity value for a first color, wherein the region comprises an intensity value for each set of colors.

The third element of claim 1, repeating the mapping and calculating for additional areas of the display corresponding to additional regions of the image, mapping each area to its own region, wherein the image is processed, is said to be shown by Szelinski at col. 29, ll. 1-3 and 54-62 and FIG. 31, (repeated mapping) as

well as col. 27, ll. 62-67 and col. 28, ll. 1-8 (repeated calculating). These passages state:

> (3) for each triangle, form a composite (blended) image;
>
> (4) paint the composite image into the final texture map using the pseudocolors assigned in step 1 as a stencil. ...
>
> In the fourth step, the pseudocolor associated with each pixel inside the composited image is found. This is done by referring to the pseudocolor of the triangle T associated with the matrix M_T used to compute x_k .about.M_k M_T^{-1} u. The composited pixel value (color or intensity) is placed into a corresponding pixel location in a triangle in the texture map if the pseudocolor of the composited pixel (stored in the auxiliary buffer constructed in step 1 above) matches the face color id tag of that triangle. ...
>
> Once a complete panoramic mosaic has been constructed, it is necessary to convert the set of input images and associated transforms into one or more images which can be quickly rendered or viewed. A traditional way to do this is to choose either a cylindrical or spherical map. When being used as an environment map, such a representation is sometimes called a latitude-longitude projection. The color associated with each pixel is computed by first converting the pixel address to a 3D ray, and then mapping this ray into each input image through the known transformation. The colors picked up from each image are then blended using the weighting function (feathering) described earlier. For example, one can convert the rotational panorama to spherical panorama using the following method:

This does not illustrate repeated mapping or repeated calculating as provided for in elements a) and b) of claim 1. Simply put, the Szeliski reference does not repeat mapping a pixel area operable to display a first color of a plurality of colors for

additional regions of an image. Further, Szeliski does not repeatedly calculate intensity values for various colors to be displayed on the display based on the intensity of the first color in the region of the image, such as red, then blue, then green. All colors are evaluated and the region colored based on the weighted color or pseudocolor average over the region.

The Szelinski design addresses triangular regions and blends aspects in bounding boxes of triangular regions, an altogether different concept form that presented and claimed in the present application. Applicant submits that based on the foregoing, all claims, as amended, materially differ from the Szelinski design and is therefore allowable over the reference.

Accordingly, it is respectfully submitted that all pending claims fully comply with 35 U.S.C. § 102.

CONCLUSION

In view of the foregoing, it is respectfully submitted that all claims of the present application are in condition for allowance. Reexamination and reconsideration of all of the claims are respectfully requested, and allowance of all the claims at an early date is solicited.

Should it be determined for any reason an insufficient fee has been paid, please charge any insufficiency to ensure consideration and allowance of this application to Deposit Account 08-2025.

Respectfully submitted,

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